

Attorney Docket No.: ASSIA 20.502 (056730-00065)

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES**

Appellant(s): Ofir Zohar
Confirmation No.: 7108
Serial No.: 10/620,080
Filed: July 15, 2003
Title: **Data Allocation In a Distributed Storage System**
Examiner: Jasjit S. Vidwan
Group Art Unit: 2182

January 24, 2008

REPLY BRIEF FOR APPELLANTS

Board of Patent Appeals and Interferences
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

A Notice of Appeal was filed on February 28, 2007 appealing the Office Action dated October 31, 2006, finally rejecting claims 1-10 and 23-32. This communication is filed in response to the Examiner's Answer dated November 27, 2007. A response to the Notice is due January 28, 2007 (January 27 being a Sunday), and therefore, this communication is being timely filed. All requisite fees may be charged to Deposit Account No. 50-1290.

The Examiner discusses the argument presented in the Appeal Brief relating to the rejections of the claims based on United States Patent No. 5,615,352 to Jacobson et al. (referred to hereinafter as Jacobson). The Examiner initially apparently agrees with Applicant's claim that figures 7 and 8 show a teaching which is contrary to the claims, but asserts that this second

embodiment (hereinafter the “second embodiment of Jacobson”) is not, and was never, relied on in the rejection of the claims (Examiner’s Answer; page 4, bottom), but rather that the Examiner had relied on a first embodiment in Jacobson (hereinafter the “first embodiment of Jacobson”). Applicants respectfully disagree and note that the Examiner relied on the second embodiment of Jacobson in an Office Action mailed May 4, 2006, in which claim 1 was rejected based in part on Jacobson at column 13, lines 43-62 (*see* page 3), i.e., precisely where the description of the second embodiment of Jacobson starts. More importantly, the rejection of the claims 1 and 23 *currently on appeal* is based at least in part on the second embodiment of Jacobson (*see* Office Action dated October 31, 2006, page 2, section 3; citing Jacobson; col. 13, lines 43-46 and 53-54). Applicants therefore disagree that the second embodiment of Jacobson has not been relied on by the Examiner, and maintain that the previously presented arguments that Jacobson does not identically disclose the features of the independent claims remain valid.

Perhaps even more confusingly, after agreeing that figures 7 and 8 of Jacobson provide a teaching contrary to the claims (*see* Examiner’s Answer; page 4, second paragraph), the Examiner asserts that the second embodiment, as well as the first embodiment, *do* disclose the features of claim 1 (*see* Examiner’s Answer; page 5, first paragraph). The Examiner apparently asserts that Jacobson deals with virtual storage areas, and that the actual use of the physical storage areas discloses the features of the present invention in both the first and second embodiments. The Examiner creates two additional figures that demonstrate the Examiner’s interpretation of the system in Jacobson, apparently relying entirely on figure 4 of Jacobson. Applicants respectfully do not accept the figures presented in the Examiner’s Answer as clearly showing the structure according to Jacobson. Applicants respectfully submit that these figures do not advance the discussion of the patentability of the instant application.

However, even accepting these figures, *arguendo*, there is no disclosure or suggestion in the figures relating to adding an additional storage device. The Examiner explains that even after the movement of data “the logical addresses would remain the same for data stripes that were not moved to [a] new drive” (Examiner’s Answer; page 5, lines 9-10). The Examiner asserts that:

even if we were to consider that the data is being moved within the initial set, it would be apparent that the logical addresses (Application level virtual storage address) remain constant for the set of data stripes that was not moved to the newly added storage drive.

(Examiner’s Answer; page 6, first paragraph). However, this is required for any storage system to work, and does not address the fundamental issue at hand relating to the location of data in the physical storage devices. Both Jacobson and the present application relate to adding new disks, and migrating data so that addresses on the physical drives change, and both Jacobson and the present application implement procedures that leave the external references unchanged. The key difference is that in the instant invention, the only data that is moved at all is data that reaches the new disk, whereas Jacobson also moves data that will never reach the new disks. Indeed, the first embodiment of Jacobson moves all of the data stored in the initial set.

Applicants respectfully submit that neither of the Jacobson embodiments disclose or suggest the feature of the present invention of “*redistributing the logical addresses among the storage devices in the extended set so as to cause a portion of the logical addresses to be transferred from the storage devices in the initial set to the additional storage device*, while maintaining the balanced access and *while maintaining the same logical addresses for the logical addresses in the initial set of storage devices that are not transferred to the additional storage device*”.

In the first embodiment of Jacobson, entire data sections are moved to an auxiliary physical location, not belonging to the added disk, before the process even starts to take place. In the first embodiment of Jacobson, upon adding a new disk 4, data is moved from an initial position to a new position which is not in the newly added space, but rather is in the initial space. (Jacobson; col. 11, line 27, to col. 13, line 28; figures 4 and 5). In particular, “one possible initial step 100 is to *reserve storage space on the presently configured disk array*” (Jacobson; col. 11, lines 41-43; emphasis added). On step 120, i.e., after step 100, “one or more storage disks are added to the disk array, such as disk 4” (Jacobson; col. 11, 64-65). At step 106:

At step 106, *all of the data contained in the selected RAID area is moved to one of the following two places*: (1) an already expanded RAID area which includes the new disk space, or (2) *other space on the storage disk array which includes the space that was reserved in step 100*.

(Jacobson; col. 12, lines 10-15; emphasis added). Therefore, at least part of the data stored in the original set is moved to the “space that was reserved in step 100”, i.e., the disk array as configured prior to the addition of the new disk storage areas, namely the initial set of disks.

Therefore, the first embodiment of Jacobson does not disclose or suggest the features of the independent claims of “redistributing the logical addresses among the storage devices in the extended set so as to cause a portion of the logical addresses to be transferred from the storage devices in the initial set to the additional storage device”, and therefore for at least this reason the independent claims, and the dependent claims therefrom, are allowable.

In regard to the second embodiment of Jacobson, the Examiner cites the place where Jacobson briefly indicates the difference between the two embodiments, and which reads as follows:

“FIGS. 7-13 show another preferred method according to this invention where segments are reorganized and packed within a

stripe during the reconfiguration process. Unlike the method described above, *data is initially moved within the selected stripe*, and not to a new location outside of the selected stripe. Additionally, with this method, on-line reconfiguration can be conducted without reserving space on the existing storage array.”

(Jacobson; col. 13, lines 28-35; emphasis added). The Examiner cites the above-language in support of demonstrating the distinction between the first and second embodiments, and simultaneously “agrees with the Appellant’s contention that Figures 7& 8 provides teachings contrary to the Examiner’s position” (Examiner’s Answer; page 4, second paragraph).

Additionally, Jacobson states in regard to figure 8 that “[t]he data in segment 4 is moved from disk 1 to the vacated segment V on disk 0 and subsequently, the data in segment 5 is moved from disk 3 to the now vacated segment on disk 1” (Jacobson; col. 14, lines 59-62). Figure 8, as well as the other figures, clearly show data being moved from storage devices which are part of the initial set of storage devices to other devices which are part of the initial set. Therefore, the second embodiment of Jacobson also does not disclose this feature of the independent claims.

Claims 1, 2, 5-10, 23, 24, and 27-32 are patentable over the Jacobson patent, and claims 3, 4, 25, and 26 are patentable over the Jacobson patent in view of the Karger reference. Accordingly, it is respectfully submitted that the Examiner erred in rejecting claims 1-10 and 23-32, and a reversal of such rejections by this Honorable Board is solicited.

Respectfully submitted,
/Brian E. Hennessey/

Brian E. Hennessey
Reg. No. 51,271

CUSTOMER NUMBER 026304
Telephone: (212) 940-6311
Fax: (212) 940-8986/8987
Docket No.: ASSIA 20.502 (056730-00065)
BEH:fd